

PRONGHORN RESPONSES TO HUNTING COYOTES

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ABSTRACT.— Six accounts of pronghorn antelope (*Antilocapra americana*) chasing or attacking coyotes (*Canis latrans*) are described: three chases by individual pronghorn does, two by herds of antelope, and one joint effort by a pronghorn doe and a Short-eared Owl (*Asio flammeus*). Modifications of Berger's (1979) ungulate antipredatory defense model are proposed.

Coyotes (*Canis latrans*) in the western United States feed on pronghorn antelope (*Antilocapra americana*). Published accounts indicate that coyote predation on pronghorn is not a particularly rare event (Thompson 1949, Arrington and Edwards 1951, Udy 1953, Beale and Smith 1973). In fact, Springer and Smith (1981) recorded pronghorn remains in more than 50 percent of the summer coyote scats they examined. Contrariwise, until recently, published accounts of responses of pronghorn to predators were uncommon, and records of pronghorn chasing or attacking coyotes were lacking. Berger (1979) described a "previously unknown defense strategy in pronghorn" in which a group of antelope chased a coyote. From this observation he developed a schematic representation of antipredatory defenses in ungulates, and concluded that predator harassment is beneficial to the prey by (1) giving naive individuals the opportunity to recognize predators in a low risk situation, (2) allowing the prey to safely monitor the predator's position, and (3) making the predator reluctant to attack in the future. Lipetz and Bekoff (1980) analyzed 25 antelope-coyote chases and concluded only that such encounters appear to have direct survival value for pronghorn fawns.

Described here are six observations of pronghorn, either singly or in groups, chasing coyotes. One event, detailed below, included a joint effort between a Short-eared Owl (*Asio flammeus*) and a pronghorn doe. A refinement of Berger's (1979) antipredatory defense model is proposed for pronghorn. All

observations were recorded in the sagebrush (*Artemisia tridentata*) dominated habitat at the National Environmental Research Park on the U.S. Department of Energy's Idaho National Engineering Laboratory (INEL) Site in southeastern Idaho.

OBSERVATIONS

Group Response

On 14 July 1978 and 18 November 1979, I witnessed groups of pronghorn chase coyotes. The first occasion was similar to Berger's (1979) report. A coyote was observed stalking a small band of antelope (4 does, 1 fawn) that was loafing and feeding about 300 m from a larger group (5 does, 2 bucks, 2 fawns). One feeding doe from the smaller band apparently sighted the coyote at a distance of nearly 100 m, stared toward the coyote for a few seconds, and sounded an alarm call. The remaining antelope of both groups were then alert and directed their attention toward the vicinity of the coyote. When the stalking coyote approached within 40 m, the group of 5 quickly joined the larger group. The coyote followed, maintaining a distance of 40–50 m from the antelope, and sat down as the groups merged. One doe (thought to be a yearling) took a few steps toward the coyote, then returned to the main group. She repeated this investigative sequence twice. On the fourth foray she was accompanied by the 13 other pronghorn. All antelope stopped momentarily about 30 m from the coyote, then burst into a full run toward the coyote.

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The coyote fled and was pursued for 300–400 m before disappearing from view.

The November 1979 encounter differed from the previous one in that 2 coyotes were observed moving near a large group of about 120 pronghorn. The pronghorn sighted the coyotes at a distance of about 200 m. A large buck left the group and walked directly toward the coyotes. He was followed by about 20 animals (both does and bucks). This group began running toward the coyotes when the distance had closed to less than 100 m. The remaining 100 or so pronghorn simply observed the chase. The coyotes immediately took flight. The pronghorn stopped chasing after running about 150 m. The coyotes continued their retreat, but at a slow run or trot, while repeatedly looking back at the pronghorn. The coyotes vanished from view at about 600 m.

My first example above, and Berger's (1979) report, suggest that pronghorn groups must contain sufficient numbers of animals before a chase will be initiated. This lower limit or threshold concept may be valid under certain conditions, but as evidenced by the following accounts it is by no means a universal trend in antelope antipredatory behavior.

Doe with Fawns

On 20 June 1978, a female pronghorn was observed nursing two fawns, seemingly unaware of a coyote furtively approaching her from the rear. While licking one fawn, the doe apparently noticed the coyote 30 m away and gave an alarm call. The fawns promptly dropped into the immobility response (Autenrieth and Fichter 1975) and the doe stared intently at the advancing coyote. The coyote approached to within 20 m, and then made a dash toward the antelope. The doe responded by charging the coyote, causing it to veer away from the fawns. The doe pursued the coyote for nearly 50 m, and then returned to a position about halfway between the fawns and the predator. Twice more the coyote ran toward the fawns, and each time was thwarted by the charging doe, who again positioned herself between her young and the coyote. The coyote slowly moved away from the antelope while the doe intently watched

its progress. When the coyote had withdrawn to a distance of 80 m, it abruptly changed its direction, putting itself on a course that would bring it within 20–30 m of the fawns. The doe again charged the coyote and pursued it for nearly 400 m before both disappeared from view. The doe returned to the area 85 minutes later, called her fawns from seclusion, and resumed nursing them.

Another postparturient doe and coyote interaction was observed on 30 June 1978. Other than the fact that this doe had only one fawn, this encounter closely followed the sequence described above: the coyote approached to within 30 m before charging, only to be charged by the doe. Second and third attacks followed; each time the coyote was chased a short distance away by the doe. On the fourth attempt, as the coyote veered from its course, the doe actually butted it in the side, rolling it over. The coyote regained its footing without losing momentum, and was vigorously pursued by the doe for about 150 m. The doe stopped, watched the coyote run away, then intermittently fed, or shamed (Autenrieth and Fichter 1975), for nearly 30 minutes before returning to the vicinity of the fawn.

A third antelope doe was observed defending two neonates, approximately two weeks old, from a pair of coyotes on 8 June 1979. When observations began (0925 hours MST) the doe was feeding and the fawns were cavorting nearby. At 0932 hours the doe spotted coyote No. 1 about 50 m to the north and gave an alarm call. The fawns immediately lay down, separated from each other by a distance of 8–10 m. As the doe focused her attention on the now stationary coyote, coyote No. 2 appeared behind coyote No. 1 and began moving in an arc toward the east. Coyote No. 2 had approached to within 20 m of the fawns when the doe charged it, causing it to move further eastward from the fawns. Almost simultaneously, coyote No. 1 dashed toward the fawns and was within 10 m of them before the doe whirled and charged, forcing it to the west of the secluded young. Coyote No. 2 then advanced and was driven off, again to the east. Coyote No. 1 again attacked, this time advancing within 1–2 m of one of the fawns before being repulsed by the doe. Bleating, the fawn burst from its bed,

and ran in a southerly direction accompanied by the doe. At the sound of the bleat, the second fawn immediately took flight, but was quickly brought down from behind by coyote No. 2. The doe and the surviving fawn ran at full speed for nearly 200 m and abruptly stopped. The fawn lay down and the doe moved in a seemingly leisure manner, roughly in a southwestward direction, frequently looking back toward the feeding coyotes.

Joint Interspecific Response

At 0545 hours on 13 May 1977, an extraordinary predator-prey encounter was observed and recorded. A single pronghorn doe was observed feeding about 400 m west of my position and about 80 m west of a Short-eared Owl nest known to contain two young. A Short-eared Owl was noticed flying oddly about 100 m north of the doe. The owl was flying in a southerly direction and repeatedly "dive bombing" from a height of 10–15 m to the top of the sage. The owl continued this undulating flight toward the now alert pronghorn. As the owl closely approached, the doe ran through the sagebrush in the same direction as the owl's flight, alternating a head up and head down posture. The latter was coordinated with short bursts of speed. The animals continued this pattern for about 100 m. As they emerged from the sagebrush into a crested wheatgrass (*Agropyron cristatum*) planting, a coyote was seen running ahead of the antelope and below the owl. Together, they pursued the coyote for nearly 300 m before the coyote reentered the sagebrush. Both the pronghorn and the owl then abandoned the chase. The doe looked in the direction of the coyote for nearly five minutes, then resumed feeding. The owl circled to a height of about 50 m and began hunting activities. Carrying a prey item, it visited the nest 15 minutes later. Further investigation indicated that the owl's mate had been on or near the nest throughout the joint antipredatory defense. It is doubtful that the antelope participating in the chase was protecting a fawn. The earliest record of pronghorns fawning on the Idaho National Engineering Laboratory Site is 23 May (1980), with the peak of fawning normally

occurring the last week of May and the first week of June each year.

CONCLUSIONS

Figure 1 is an adaptation of Berger's (1979) antipredatory defense model for ungulates, and represents my proposed spectrum of pronghorn responses to hunting coyotes. The wide solid arrows indicate the responses most likely to occur in pronghorn coyote encounters. Narrow solid lines represent documented responses that occur less often, and the wavy arrows account for the rare observation of concurrent, interspecific chasing. The dashed arrows indicate some possible reactions of pronghorn to hunting coyotes that were not recorded in my observations.

The actions taken by pronghorn when confronted by coyotes appear to be generally related to the size and composition of the pronghorn group. Individuals unaccompanied by fawns, or small groups of pronghorn, tend to retreat from coyote predators, often joining other bands of pronghorn. Larger groups of pronghorn exhibit a continuum of responses ranging from mild interest, or curiosity, to actual attack that in the broadest context represents mobbing behavior (Harvey and Greenwood 1978). My observations indicate the postparturient does, with fawns nearby, invariably attack or chase coyotes advancing toward them. The intensity of these attacks, and the context in which they occur, closely resembles the antipredatory response of "snarling" described by Curio (1975). The constancy of this behavior supports the thesis that, in certain situations (i.e., does with fawns nearby), predator harassment has direct survival value for pronghorn fawns (Lipetz and Bekoff 1980). The significance of the joint (cooperative?) chase by a pronghorn doe and a Short-eared Owl is unknown.

There are two plausible interpretations of this event. First, as several instances of pronghorn chasing Short-eared Owls in an antipredatory context have been observed (Fichter, pers. comm., Copeland, in litt.), it is possible that the doe was responding to both the coyote and the owl as potential predators. However, if the doe was not protecting a fawn (the date of this encounter suggests she was not), the adaptive advantage, or evo

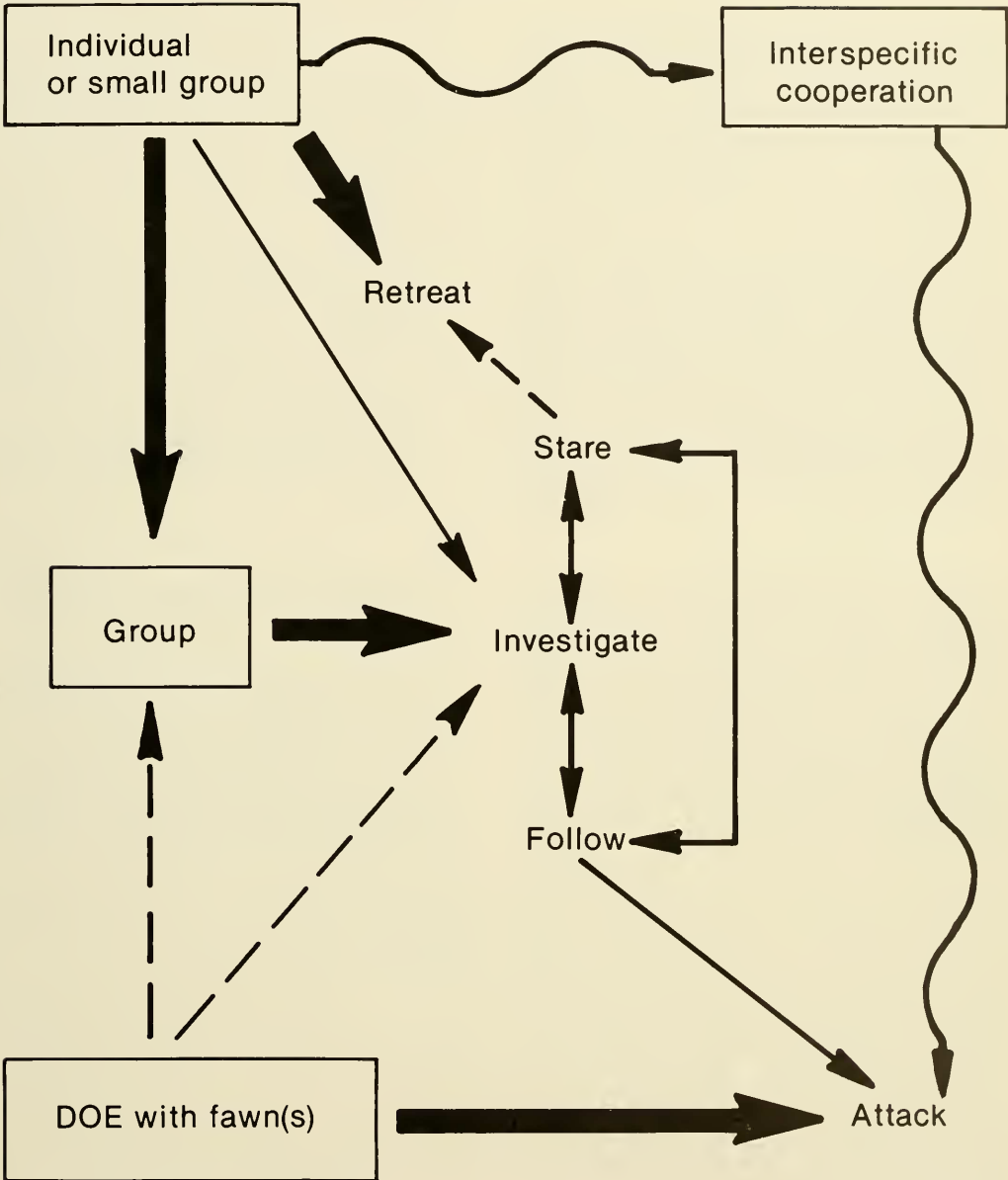


Fig. 1. A proposed model of the responses of pronghorn antelope to coyotes. See text for the explanation of arrows.

lutionary significance of her actions is not obvious. On the other hand, as this paper and that by Lipetz and Bekoff (1980) suggests, pronghorn chasing coyotes is not an exceptionally rare event. Although published records are few, Short-eared Owls have not infrequently been observed mobbing predatory species, including coyotes (pers. obs., Trost, pers. comm., Clark 1975). It is likely that the antelope-owl-coyote interaction described

here represents a mutual, albeit fortuitous, effort by the antelope and owl to hustle the coyote. The proximity of the chase to the owl nest makes the reasons behind the owl's involvement obvious. The factors precipitating the antelope's behavior are less certain. Fichter (unpublished data) witnessed a buck band of over a dozen pronghorn chase a coyote in mid-June 1965. These animals pursued the predator for 1-1.5 km, passing in front of and

circling the running coyote at least twice, a sequence frequently associated with moving vehicles in pronghorn country. It is possible that in certain low-risk situations, such as when a coyote is already fleeing from harassment, antelope may participate in the chase as a playlike exercise. This might represent a learning experience for the prey and/or predator, lending support to any or all of Berger's (1979) explanations for ungulates attacking predators. However, the rarity of birds and mammals jointly mobbing a potential predator precludes a convenient analysis of the role of this interspecific behavior in the relationship of predators and prey. More data are required before the evolutionary significance of this and similar observations can be properly assessed.

ACKNOWLEDGMENTS

This is a contribution from the INEL Site Ecological Studies Program, supported by the Office of Health and Environmental Research, U.S. Department of Energy. I thank R. E. Autenrieth for his suggestions and M. W. Barrett, P. T. Bromley, E. Fichter, O. D. Markham, J. M. Peek, F. L. Rose, and G. E. Svendsen for improving the drafts of this manuscript.

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